AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-34 (canceled)

35. (currently amended) A method of detecting a target polynucleotide which comprises the steps of:

a) contacting a target polynucleotide having a first portion and a second portion immediately contiguous to one another with:

i) an invader oligonucleotide, at least a part of which is capable of specifically hybridizing to the first portion of the target polynucleotide;

ii) a first probe oligonucleotide comprising a first region that is capable of specifically hybridizing to the second portion of the target polynucleotide and an unpaired region located adjacent to the first region; and

iii) a reagent that is capable of cleaving to release the unpaired region of the first probe oligonucleotide to produce a cleaved unpaired region when the first probe oligonucleotide is hybridized to the second portion of the target polynucleotide and the invader oligonucleotide is hybridized to the first portion of the polynucleotide;

under conditions ~~such that~~ wherein said first probe oligonucleotide is cleaved to produce said cleaved unpaired region, and wherein a second cleavage structure cleavable by said reagent is formed, said second cleavage structure comprising said ~~the~~ cleaved unpaired region ~~of the probe oligonucleotide~~ and a second probe oligonucleotide, and ~~and the reagent can come into contact with an incomplete cleavage structure, to which the unpaired region of the probe oligonucleotide is capable of hybridizing, to form a complex that can~~ wherein said second cleavage structure ~~be~~ is cleaved by the reagent to provide a ~~product capable of being detected~~ a detectable signal;

b) detecting ~~the product to provide a~~ the accumulation of signal; and

c) determining whether the signal ~~exhibits a specific behavior as a function of time , wherein said specific behavior as a function of time is non-linear~~ accumulates exponentially over time, ~~and~~ wherein said exponential accumulation of signal over time~~that~~

~~exhibits said specific behavior as a function of time~~ is indicative of the presence of said target nucleic acid.

36-46 (canceled)

47. (previously presented) The method of Claim 35 wherein the signal is fluorescence or phosphorescence.

48-61 (canceled)

62. (new) A method for detecting the presence of a target nucleic acid molecule in a sample, comprising:

a) incubating a sample with a cleavage agent under conditions wherein a first cleavage structure is formed, said first cleavage structure comprising:

i) a target nucleic acid, said target nucleic acid comprising a first region and a second region, said second region upstream of and contiguous to said first region;

ii) a first nucleic acid molecule comprising a first portion that is completely complementary to the second region of the target polynucleotide;

iii) a second nucleic acid molecule comprising a 3' portion and a 5' portion, wherein said 5' portion is completely complementary to said first region of said target nucleic acid;

wherein said 5' portion of said second nucleic acid molecule is annealed to said first region of said target nucleic acid and wherein at least a portion of said first nucleic acid molecule is annealed to said second region of said target nucleic acid,

b) cleaving said first cleavage structure with a cleavage agent so as to generate non-target cleaved oligonucleotide under conditions wherein a second cleavage structure is formed, said second cleavage structure comprising:

i) said non-target cleavage product; and

ii) a second probe oligonucleotide;

c) cleaving said second cleavage structure with a cleavage agent so as to generate a detectable signal, wherein said detectable signal accumulates at an exponential rate over time, and wherein accumulation of said detectable signal at an exponential rate over time indicates the presence of said target nucleic acid in said sample; and

d) detecting said detectable signal at a plurality of time points.

63. (new) The method of Claim 62, wherein said detecting said detectable signal comprises detection of fluorescence.

64. (new) The method of Claim 62, wherein said detecting said detectable signal comprises detection of mass.

65. (new) The method of Claim 62, wherein said detecting said detectable signal comprises detection of fluorescence energy transfer.

66. (new) The method of Claim 62, wherein said detecting said detectable signal comprises detection selected from the group consisting of detection of radioactivity, luminescence, phosphorescence, fluorescence polarization, and charge.

67. (new) The method of Claim 62, wherein said cleavage agent comprises a 5' nuclease.

68. (new) The method of Claim 67, wherein said 5' nuclease is thermostable.

69. (new) The method of Claim 68, wherein said thermostable 5' nuclease comprises a 5' nuclease of a DNA polymerase.

70. (new) The method of Claim 69, wherein said DNA polymerase is *Taq* DNA polymerase.

71. (new) The method of Claim 62, wherein said 3' portion of said second nucleic acid molecule consists of a single nucleotide.

72. (new) The method of Claim 69, wherein said single nucleotide is complementary to said target nucleic acid.

73. (new) The method of Claim 62, wherein a plurality of said first nucleic acid molecule is provided, such that said first nucleic acid molecule is in concentration excess compared to said target nucleic acid.

74. (new) The method of Claim 62, wherein a plurality of said second nucleic acid molecule is provided, such that said second nucleic acid molecule is in concentration excess compared to said target nucleic acid.

75. (new) The method of Claim 62, wherein said target nucleic acid and said second nucleic acid molecule form a duplex, and wherein a plurality of said first nucleic acid molecule is provided such that said first nucleic acid molecule is in concentration excess compared to said duplex.

76. (new) The method of Claim73, wherein said cleaving said cleavage structure comprises cleaving said first nucleic acid molecule to generate non-target cleavage product.

77. (new) The method of Claim 76, wherein said non-target cleavage product from said first nucleic acid molecule is generated in concentration excess compared to said duplex.

78. (new) The method of Claim 68, wherein said thermostable 5' nuclease is a FEN-1 nuclease.

79. (new) The method of Claim 78, wherein said thermostable FEN-1 nuclease is an archaeal FEN-1 nuclease.

80. (new) The method of Claim 79, wherein said archaeal FEN-1 nuclease is selected from the group consisting of *Methanococcus jannaschii* FEN-1 and *Pyrococcus furiosus* FEN-1.

81. (new) The method of Claim 35, wherein said reagent is a thermostable 5' nuclease.

82. (new) The method of Claim 81, wherein said thermostable 5' nuclease is a FEN-1 nuclease.

83. (new) The method of Claim 82, wherein said FEN-1 nuclease is an archaeal FEN-1 nuclease.

84. (new) The method of Claim 83, wherein said archaeal FEN-1 nuclease is selected from the group consisting of *Methanococcus jannaschii* FEN-1 and *Pyrococcus furiosus* FEN-1.